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EXAMINER	
LOUIE, MANDY C	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/569,838	KANO ET AL.	
	Examiner	Art Unit	
	MANDY C. LOUIE	1715	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *38-45,54-64 and 75-81* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *38-45, 54-64, 75-81* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 62 and 76 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Regarding claims 62 and 76, the limitation "varying a ratio of a feed rate of the source material further comprising fluorine to a feed rate of the source material further comprising hydrogen" is indefinite, since there appears to be only one source material currently recited, hence, one source material should only have one feed rate.

The other dependent claims do not cure the defects of the claims from which they depend; therefore, the dependent claims are also rejected under 35 U.S.C. 112, second paragraph.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 79 is rejected under 35 U.S.C. 102(b) as being anticipated by Hiramatsu [The 16th symposium abstract: Fabrication of carbon nanowalls using RF plasma CVD].

Regarding claim 79, Hiramatsu teaches a method for producing carbon nanowalls [title] comprising creating a plasma atmosphere in at least one region of a reaction chamber (main chamber) by plasmatizing a source material containing carbon; introducing radicals generated outside (remote source) the plasma atmosphere into the plasma atmosphere (i.e. reaction chamber); and growing carbon nanowalls on a base material (substrate) disposed in the reaction chamber [pg 20]. Hiramatsu further teaches the introduced radicals are H radicals from an H_2 plasma to the reaction chamber in a closed system coupled to a pump [Hiramatsu pg 20]. Since the prior art does not teach providing an oxygen source to the process and produces hydrogen radicals from a H_2 gas, it is suggested by the prior art that such process would not include OH radicals or O radicals.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 38, 40-42, 44-45, 54, 57, 60-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu [Fabrication of Carbon Nanowalls using RF Plasma CVD] in view of Goto [US 5980999].

Regarding claim 38, Hiramatsu teaches a method for producing carbon nanowalls [title] by creating a plasma atmosphere in at least one region of a reaction chamber (main reaction chamber) by plasmatizing a source material containing carbon; introducing radicals generated outside the plasma atmosphere (remote source) into the plasma atmosphere (main reaction chamber), wherein a radical generating area is located outside the plasma generating area (remote H_2 ICP) and is provided H_2 to generate hydrogen radicals (decomposing H_2 radical source to generate hydrogen radicals); and growing carbon nanowalls on a base material (substrate) disposed in the reaction chamber [pg 20].

However, Hiramatsu appears to be silent in teaching the radical-generating area is disposed in the reaction chamber (while being located outside the plasma generating area). Goto remedies this.

Regarding claim 38, Goto teaches a method of introducing reactive gas and radicals to a plasma chamber [abstract], wherein the radical-generating area is disposed in the reaction chamber (while being outside the plasma generating area (109)) [Fig. 1 or Fig. 7], wherein the radical may be a hydrogen radical [col 2, ln 54].

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a radical generating area disposed in the reaction chamber as taught by Goto. One would have been motivated to do so to effectively control the

density or composition of the radicals [col 16, ln 54-62]. It would further be obvious to one of ordinary skill in the art to adjust the radical density in order to better control the reaction process.

Regarding claim 40, the prior art teaches the radicals are generated by applying microwave, UHF waves, VHF waves, or RF waves [Goto, col 3, ln 20-30].

Regarding claim 41, the prior art teaches the radicals include hydrogen radicals [Hiramatsu, pg 20, col 1].

Regarding claim 42, the prior art teaches the hydrogen radicals are generated by introducing hydrogen gas (radical source) and decomposed to produce the hydrogen radicals to be supplied to the plasma atmosphere [Goto, col 4, ln 55-60].

Regarding claim 44, the prior art teaches the source material further comprises fluorine (i.e. C2F6) [Hiramatsu, pg 20, col 1].

Regarding claim 45, the prior art teaches the feed rate of the source material or feed rate of the radicals may be controlled based upon the density of the radicals in the reaction chamber [Goto, col 5, ln 5-46; col 2, ln 13-20].

Regarding claim 54, the prior art teaches the carbon nanowalls are successfully deposited on a silicon (100) substrate [Hiramatsu, pg 20] without indication of critically using metal catalyst on the substrate to generate such structures from the process; hence, it would have been inherent that such substrate would have no metal catalyst.

Regarding claim 57, the prior art teaches the source material comprises at least one compound selected from the group consisting of C2F6 [Hiramatsu, pg 20, col 1].

Regarding claim 60, the prior art teaches the introduced radicals are H radicals from an H_2 plasma to the reaction chamber in a closed system coupled to a pump [Hiramatsu pg 20] without indications of critically providing an oxygen source; hence, it would have innate to the prior art that such radicals would include no OH radicals.

Regarding claim 61, the prior art teaches an amount of radicals in one regions is measured, and wherein the feed rate of either the source material or radical is controlled based upon the amount of radicals [col 7, ln 5-25].

3. Claims 43 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Goto and further in view of Wu [US 20030129305]

Teaching of Hiramatsu in view of Goto is aforementioned, but appears to be silent in teaching the source material further comprising hydrogen. Wu remedies this.

Regarding claim 43 and 56, Wu teaches methane (CH_4) may be a suitable carbon building source for forming nanowalls [0042].

It would have been obvious to one of ordinary skill in the art to provide methane as a carbon source to form nanowalls. One would have been motivated to do so to choose a building materially that is known to effectively form carbon nanowalls and is readily available.

4. Claims 39, 45 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Goto and further in view of Kirimura [US 6383896].

Teaching of the Hiramatsu in view of Goto is aforementioned, but appears to be silent in teaching the radicals are introduced in a direction perpendicular to a surface of the base material. Kirimura remedies this.

Regarding claim 39, Kirimura teaches a method and apparatus for providing radicals to a chamber [abstract], wherein the radical may be hydrogen [col 6, ln 25]. Kirimura further teaches the radicals may be introduced in a direction perpendicular to the surface of the base material [Fig. 1-3].

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the radicals in a direction perpendicular to the surface of the base material as suggested by Kirimura. One would have been motivated to do so to uniformly (non-impeded) emit the radicals to the target surface [Kirimura col 2, ln 61-65] so as to effectively form nanowalls over the entire surface of the base material from the reaction process.

Regarding claim 45, teaching of Hiramatsu in view of Goto is aforementioned, but appears to be silent in teaching at least one of a feed rate of the source material, a plasmatization degree of the source material, and a feed rate of the radical is controlled based on a concentration of carbon radicals, hydrogen radicals, or fluorine radicals in the reaction chamber. Kirimura remedies this.

Regarding claim 45, Kirimura teaches controlling a feed rate of radicals (or plasmatization degree of the source material, col 3, ln 45-50) based on a concentration of the ion produced from a source gas and radical source gas [col 2, ln 45-52], which would innately be based upon on a concentration of either carbon radicals, hydrogen radicals, or fluorine radicals from the prior art teaching of using C2F6 as a carbon source gas and hydrogen gas as a radical source gas [Hiramatsu, pg 20, col 1].

It would have been obvious to one of ordinary skill in the art at the time of the invention to control the feed rate of the source material or feed rate based upon the concentration of radicals as suggested by Kimura. One would have been motivated to do so to reduce any potential plasma damage (or growth inhibition) to the product formation [Kimura, col 6, ln 45-50] caused by excessive number of radicals, and optimize the reaction between the materials.

Regarding claim 64, teaching of Hiramatsu in view of Goto is aforementioned, but appears to be silent in pretreating the base material by apply the radicals to the base material before plasmatizing the source material. Kirimura remedies this.

Regarding claim 64, Kirimura teaches a coating method and system for providing radicals to a chamber [abstract] wherein the prior art teaches pretreating the base material by apply radicals to the base material before plasmatizing the source material [col 6, ln 56-65].

It would have been obvious to one of ordinary skill in the art at the time of the invention to pretreat the base by applying the radicals before plasmatizing the source material as suggested by Kimura. One would have been motivated to do so in order to improve the interface between the substrate and a coating (i.e. prepare the surface for deposition) [Kimura, col 6, ln 56-65].

5. Claims 43, 55-56, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Goto, and further in view of Nagasawa [US 20020072249].

Teaching of Hiramatsu in view of Goto is aforementioned, but appears to be silent in teaching the source material comprising the materials recited in claims 43, 55-56, and 58. Nagasawa remedies this.

Regarding claims 43, 55-56, and 58, Nagasawa teaches forming a carbon containing film (i.e. silicon carbide) on a substrate [abstract], wherein the prior art teaches the carbon gas source for forming the film may be at least one of CH_4 (carbon and hydrogen), CHF_3, CF_4 [0075]. Such that, it would have been obvious to one of ordinary skill in the art at the time of the invention to either use CH_4, CHF_3, CF_4 as a carbon gas source as suggested by Nagasawa, since either one of these gases may be operable equivalents for carbon gases sources in forming a carbon film. It is also noted by the examiner that it is well known in the art that methane is a common carbon precursor for carbon structures. In addition, the limitation 'essential component' is relative, wherein it would have been obvious to one of ordinary skill in the art that

6. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Goto and Nagasawa, and further in view of Smalley [US 6683783] and Goruganthu [US 6780664].

Teaching of Hiramatsu in view of Goto and Nagasawa is aforementioned, but appears to be silent to the limitations of claim 59. Smalley and Goruganthu remedy this.

Regarding claim 59, Smalley teaches a method of forming nanostructures, where by changing the feedstock from a hydrocarbon to a BN (boron nitrogen) precursor during growing, it is possible to form a nanostructure with alternating regions of carbon lattice and BN lattice, wherein the BN modification can provide enhanced insulating

properties to the nanostructure [col 29, ln 30-50]. In addition, Goruganthu teaches fluorine additions to a nanostructure may provide additional electrical properties (i.e. dielectric) [col 5, ln 27-31]. Since the prior art teaches CH_4, C_2F_6, and CHF_3 are all plausible carbon sources [Nagasawa, 0075], it would have been obvious to one of ordinary skill in the art switch between the carbon sources so as to form alternating regions with different electrical properties (i.e. regions that are more dielectric than other regions).

7. Claims 55 and 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Goto, and further in view of Merkulov [US 6649431]

Teaching Hiramatsu in view of Goto is aforementioned, but appears to be silent to varying the feed rate of the source material further comprising hydrogen and fluorine. However, Hiramatsu appears to be silent to varying the feed rate of the source material further comprising hydrogen and fluorine. Merkulov remedies this.

Regarding claim 62, Merkulov teaches adjusting the ratio of carbon source gas to an etchant gas both as source material for the nanostructure (wherein the etchant gas may be hydrogen, col 6, ln 10-14) [col 5, ln 20-44].

It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the feed rate of the source material (which comprises both the source gas (i.e. C2F6) and etchant (i.e. hydrogen)) as suggested by Merkulov. One would have been motivated to do so better control the growth morphology of the nanostructure [Merkulov col 5, ln 35-40].

Regarding claim 55, in light of Merkulov, it would have been obvious to one of ordinary skill in the art that both the carbon source (i.e. C2F6) (taught by Hiramatsu) added with an etchant (i.e. hydrogen gas, taught by Merkulov) would have been essential to controlling the shape of the nanostructure.

8. Claim 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Goto, and further in view of Lee [US 20020046953]

Teaching of Hiramatsu in view of Goto is aforementioned, but appears to be silent in teaching the limitation of orientating the nanostructure by tilting a line normal to the base material with respect to the direction of the electric filed. Lee remedies this.

Regarding claim 63, Lee teaches the carbon structures may be orientated in the direction of a plasma discharge (i.e. electric field) wherein by either tilting the substrate or electric source, the carbon structures may be formed at other angles to the substrate [0071].

It would have been obvious to one of ordinary skill in the art at the time of the invention to orient a nanostructure by tilting an electric field source. One would have been motivated to do so to achieve a tilt orientation if so desired (depended upon the function of the nanostructure in a device).

9. Claims 75 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Nagasawa [US 2002/0072249].

Regarding claim 75, Hiramatsu teaches a method for producing carbon nanowalls [title] comprising creating a plasma atmosphere in at least one region of a reaction chamber (main chamber) by plasmatizing a source material containing carbon;

introducing radicals generated outside (remote source) the plasma atmosphere into the plasma atmosphere (i.e. reaction chamber); and growing carbon nanowalls on a base material (substrate) disposed in the reaction chamber [pg 20]. However, Hiramatsu appears to be silent in teaching the source material comprising a compound selected form the group consisting of CH4, CF4, CHF3. Nagasawa remedies this.

Regarding claim 75, Nagasawa teaches forming a carbon containing film (i.e. silicon carbide) on a substrate [abstract], wherein the prior art teaches the carbon gas source for forming the carbon containing film may be at least one of CH_4 (carbon and hydrogen), CHF_3, CF_4 [0075]. Such that, it would have been obvious to one of ordinary skill in the art at the time of the invention to either use CH_4, CHF_3, CF_4 as a carbon gas source as suggested by Nagasawa, since either one of these gases may be operable equivalents for carbon gases sources in forming a carbon containing film. It is also noted by the examiner that it is well known in the art that methane is a common carbon precursor for carbon structures.

Regarding claim 77, since Nagasawa teaches CH_4, CHF_3, CF_4 may be operable equivalents for carbon gases sources and the relativity of the limitation 'essential component', it would have been obvious to one of ordinary skill in the art that the components of CHF_3 as a carbon source would be essential.

10. Claim 75 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Wu [US 2002/0072249].

Regarding claim 75, Hiramatsu teaches a method for producing carbon nanowalls [title] comprising creating a plasma atmosphere in at least one region of a

reaction chamber (main chamber) by plasmatizing a source material containing carbon; introducing radicals generated outside (remote source) the plasma atmosphere into the plasma atmosphere (i.e. reaction chamber); and growing carbon nanowalls on a base material (substrate) disposed in the reaction chamber [pg 20]. However, Hiramatsu appears to be silent in teaching the source material comprising a compound selected form the group consisting of CH4, CF4, CHF3. Wu remedies this.

Regarding claim 75, Wu teaches methane (CH_4) may be a suitable carbon building source for forming nanowalls [0042].

It would have been obvious to one of ordinary skill in the art to provide methane as a carbon source to form nanowalls. One would have been motivated to do so to choose a building materially that is known to effectively form carbon nanowalls and is readily available.

11. Claims 76-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Merkulov [US 6649431]

Regarding claim 76, Hiramatsu teaches a method for producing carbon nanowalls [title] comprising creating a plasma atmosphere in at least one region of a reaction chamber (main chamber) by plasmatizing a source material containing carbon; introducing radicals generated outside (remote source) the plasma atmosphere into the plasma atmosphere (i.e. reaction chamber); and growing carbon nanowalls on a base material (substrate) disposed in the reaction chamber [pg 20]. However, Hiramatsu appears to be silent to varying the feed rate of the source material further comprising hydrogen and fluorine. Merkulov remedies this.

Regarding claim 76, Merkulov teaches adjusting the ratio of carbon source gas to an etchant gas both as source material for the nanostructure (wherein the etchant gas may be hydrogen, col 6, ln 10-14) [col 5, ln 20-44].

It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the feed rate of the source material (which comprises both the source gas (i.e. C2F6) and etchant (i.e. hydrogen)) as suggested by Merkulov. One would have been motivated to do so better control the growth morphology of the nanostructure [Merkulov col 5, ln 35-40].

Regarding claim 77, in light of Merkulov, it would have been obvious to one of ordinary skill in the art that both the carbon source (i.e. C2F6) (taught by Hiramatsu) added with an etchant (i.e. hydrogen gas, taught by Merkulov) would have been essential to controlling the shape of the nanostructure.

12. Claim 78 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Nagasawa and further in view of Smalley [US 6683783] and Goruganthu [US 6780664].

Hiramatsu teaches a method for producing carbon nanowalls [title] comprising creating a plasma atmosphere in at least one region of a reaction chamber (main chamber) by plasmatizing a source material containing carbon; introducing radicals generated outside (remote source) the plasma atmosphere into the plasma atmosphere (i.e. reaction chamber); and growing carbon nanowalls on a base material (substrate) disposed in the reaction chamber [pg 20], wherein Nagasawa teaches CH_4, CHF_3, CF_4

may be operable equivalents for carbon gases sources [0075] However, Hiramatsu appears to be silent to the limitations of claim 59. Smalley and Goruganthu remedy this.

Regarding claim 78, Smalley teaches a method of forming nanostructures, where by changing the feedstock from a hydrocarbon to a BN (boron nitrogen) precursor during growing, it is possible to form a nanostructure with alternating regions of carbon lattice and BN lattice, wherein the BN modification can provide enhanced insulating properties to the nanostructure [col 29, ln 30-50]. In addition, Goruganthu teaches fluorine additions to a nanostructure may provide additional electrical properties (i.e. dielectric) [col 5, ln 27-31]. Since the prior art teaches CH_4, C_2F_6, and CHF_3 are all plausible carbon sources [Nagasawa, 0075], it would have been obvious to one of ordinary skill in the art switch between the carbon sources so as to form alternating regions with different electrical properties (i.e. regions that are more dielectric than other regions).

13. Claim 80 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Lee [US 20020046953].

Regarding claim 80, Hiramatsu teaches a method for producing carbon nanowalls [title] comprising creating a plasma atmosphere in at least one region of a reaction chamber (main chamber) by plasmatizing a source material containing carbon; introducing radicals generated outside (remote source) the plasma atmosphere into the plasma atmosphere (i.e. reaction chamber); and growing carbon nanowalls on a base material (substrate) disposed in the reaction chamber [pg 20]. However, Hiramatsu appears to be silent in teaching the limitation of orientating the nanostructure by tilting a

line normal to the base material with respect to the direction of the electric filed. Lee remedies this.

Regarding claim 80, Lee teaches the carbon structures may be orientated in the direction of a plasma discharge (i.e. electric field) wherein by either tilting the substrate or electric source, the carbon structures may be formed at other angles to the substrate [0071].

It would have been obvious to one of ordinary skill in the art at the time of the invention to orient a nanostructure by tilting an electric field source. One would have been motivated to do so to achieve a tilt orientation if so desired (depended upon the function of the nanostructure in a device).

14. Claim 81 rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu in view of Kirimura [US 6383896].

Regarding claim 81, Hiramatsu teaches a method for producing carbon nanowalls [title] comprising creating a plasma atmosphere in at least one region of a reaction chamber (main chamber) by plasmatizing a source material containing carbon; introducing radicals generated outside (remote source) the plasma atmosphere into the plasma atmosphere (i.e. reaction chamber); and growing carbon nanowalls on a base material (substrate) disposed in the reaction chamber [pg 20]. However, Hiramatsu appears to be silent in pretreating the base material by apply the radicals to the base material before plasmatizing the source material. Kirimura remedies this.

Regarding claim 81, Kirimura teaches a coating method and system for providing radicals to a chamber [abstract] wherein the prior art teaches pretreating the base

material by apply radicals to the base material before plasmatizing the source material [col 6, ln 56-65].

It would have been obvious to one of ordinary skill in the art at the time of the invention to pretreat the base by applying the radicals before plasmatizing the source material as suggested by Kimura. One would have been motivated to do so in order to improve the interface between the substrate and a coating [Kimura, col 6, ln 56-65].

Response to Arguments

15. Applicant's arguments with respect to claims 38-45, 54-64 have been considered but are moot in view of the new ground(s) of rejection necessitated by amendments (i.e. decomposing a radical source in a radical generating area which is disposed in the reaction chamber).

16. Applicant's arguments filed 04/26/10 have been fully considered but they are not persuasive.

Regarding applicant's argument of Hiramatsu [pg 9-10 of remarks] failing to teach the radical generated in a radical generating area disposed in the reaction chamber is moot, since Goto is provided to teach such deficiency. See above rejection for more details.

Regarding applicant's argument of Nagasawa, wherein there is no motivated to use the gases of Nagasawa for forming nanowalls, since claimed invention is operable with methane (i.e. claim 56) and wherein Nagasawa is relied upon to teach methane, CHF3 and CF4 as plausible building material (even though for the carbon portion of a

silicon carbide film), it is reasoned that such materials (i.e. methane, CHF3, CF4) would be operable equivalent carbon sources for forming nanowalls, unless evidence is provided showing otherwise.

Regarding applicant's argument of Kirimura disclosing a method for forming a silicon based film with uniform thickness, it is noted that Kirimura teaches the deposition gas and the radical material gas can be selected in accordance with the film to be formed [col 6, ln 14-16], suggesting that the system taught by Kirimura is open to a variety of different deposition films. Moreover, Kirimura is associated with the invention in which how decomposed radicals may be introduced to a chamber to treat a substrate and form products on the substrate [abstract] as required by the recited claim.

Regarding applicant's argument of Merkulov and Lee drawn to forming carbon nanotubes, it is noted that Merkulov teaches modifying the composition of carbonaceous source material to affect the shape morphology of a carbon tip [col 5, ln 35-40], which would be applicable to carbon nanowalls since both structures utilizes similar materials to form a carbon structure (wherein nanowalls appear to be shape-manipulated carbon structures), and Lee teaches orienting carbon nanotubes by means of an electric field in order to grow nanostructures at an angle to the substrate if desired [0071], wherein again, since carbon nanowalls and nanotube comprise of similar material (i.e. carbon),where such modification (i.e. angling the carbon nanowall by an electric field) would be reasonably applicable.

And, although the applicant cites "examiner admitted that definite differences existed between nanotubes and nanowalls," rather, during the interview the definition of nanowall was probed; however, did not result in an agreement at that time.

Conclusion

1. No claim is allowed.

2. Claims 38-45, 54-64, 75-81 are rejected for the reasons aforementioned.

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C. LOUIE whose telephone number is

(571)270-5353. The examiner can normally be reached on Monday to Friday, 7:30AM - 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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